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Science and Technology Perspectives

DEVELOPMENTS

Telecommunications Chip Standard

(Netherlands) Philips and Siemens have decided to adopt a standard architecture for telecommunications systems chips. They have chosen the so-called IOM (Integrated-Services-Digital-Network Oriented Modular) architecture, which until now has been used only by Siemens. (Amsterdam COMPUTABLE 18 Jul 86) Antwerp/ STAT

Portable Minilaser

(Hungary) A 4 kg minilaser, which the Hungarians call the world's first," has been developed at the Institute for Solid State Physics of the Central Physics Research Institute. The device uses a special phosphate glass, a recent product of Moscow's Prokhorov Institute, which is less costly and absorbs a greater concentration of neodymium ions than a YAG crystal. The device can be used in spot welding, drilling, and in processing microelectronic parts. (Budapest MAGYAR NEMZET 14 Jul 86 p 6) STAT

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FEATURE ARTICLES

In an attempt to keep pace with modern US and British technology, the Japanese are hoping to develop an energy-efficient aircraft, a Mach 25 hypersonic aircraft, and two types of commuter aircraft. The PRC is expected to participate in the commuter aircraft development.

To a large extent, the announcement of 62 new Eureka projects has been favorably received by the European press. The French press, however, comments that Eureka would not promote the development of competitive European technology.

Analysis of effluent gases in melt processes permits Soviet metallurgists to monitor melt composition without halting the process.

REPORTS

PERSPECTIVES selections are based solely on foreign press, books and journals, or radio and television broadcasts. Some of the materials used in this publication will appear as abstracts or translations in the FBIS serial reports. Comments and queries regarding this publication may be directed to the Center Chief, to individuals at the numbers listed with items, or to the Science and Technology Center at

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DEVELOPMENTS

DEVELOPMENTS highlights worldwide S&T events reported in the foreign media. Items followed by an asterisk will be published by FBIS. The contributor's name and telephone number are provided.

Agricultural Radiology

(USSR) A new Scientific Research Institute of Agricultural Radiology has been established in Georgia. It will be a basic research center functioning primarily as an experimental training center for problems dealing with use of isotopes and radiation in agriculture and the peaceful use of atomic energy under the CEMA program. (Tbilisi ZARYA VOSTOKA 15 Apr 86 p 2)* STAT

Biotechnology

(Denmark) On 30 May, the Danish Parliament introduced legislation—the first of its kind in the world—to control the use of genetically manipulated organisms to protect the environment and human health. The biotechnology industry criticizes the law as an unnecessary obstacle. (Stockholm NY TEKNIK 19 Jun 86)* STAT

(Hungary) Hungary has recently achieved success in biotechnology research, particularly in the field of animal husbandry. Embryo implantation has already been realized and in vitro fertilization and cloning are projected for the near future. For more information, see FPN-099 "Hungary: Biotechnical Advances in Livestock Breeding." (Hungary IMPULZUS 17 May 86) STAT STAT

Technical Education

(South Korea) South Korea has established the Korea Institute of Technology (KIT), that nation's first technical university. Staffed with top-notch instructors and equipped with state-of-the art facilities, the institute will graduate scientists and engineers in such fields as electronics, computers, machine tools, robotics, and new materials in an effort to help South Korea become one of the world's industrial leaders by the year 2000. (HANKUK ILBO 19 Jun 86, KYONGHYANG SINMUN 20 Jun 86) STAT

Software, Peripherals

(Hungary) SZKI (Computer Technology Coordinating Institute) expects to sell three million dollars worth of computer software products this year. The most popular is the M PROLOG program which is compatible with a variety of computers including the MacIntosh and can also process Japanese ideograms. SZKI has sold 800 M PROLOG packages to European countries, Japan, Canada, and the US. In addition to software products, SZKI plans to develop a character reader and a speech synthesizer that can recognize, store, and interpret handwritten and graphic texts, and read back the materials stored. (Budapest NEPSZABADSAG 15 Jul 86 p 1) STAT

Space Program

(UK) The British National Space Center has submitted a report to the government defining the objectives, programs, financing, and organization of future UK space activities through the end of the century. The plan stresses UK participation in ESA programs such as Ariane 5, Hermes, and Columbus and recommends European development of the HOTOL unmanned shuttle. It also defines national programs in the fields of remote sensing and telecommunications. (Paris AIR & COSMOS 28 Jun 86)* STAT SIAI

Swiss-EEC Accord

(Switzerland) Switzerland and the EEC have agreed to cooperate in scientific and technical programs—including the Community's ESPRIT (information technology), BRITE (factory automation), RACE (telecommunications), EURAM (advanced materials), and biotechnology programs. The committee met for the first time in Brussels on 2 July and the next meeting is planned for early 1987. (London ELSA DATABASE 3 Jul 86) Antwerp/ STAT STAT

Technology Transfer

(FRG/USSR) The long-awaited agreement on S&T cooperation between the FRG and the USSR appears to have been reached. On 22 July, Research Minister Riesenhuber flew to Moscow to sign the agreement. (Hamburg DPA 21 Jul 86) STAT

Telecommunications Network System

(Switzerland) Swissnet, the future Swiss ISDN (Integrated Services Digital Network), is scheduled for completion in two steps: Swissnet 1 (1988) and Swissnet 2 (1990). (Paris LE MONDE INFORMATIQUE 16 Jun 86) Antwerp/ STAT

JAPAN/PRC: AIRCRAFT INDUSTRY KEEPS ABREAST OF US TECHNOLOGY

Key Points: According to the Tokyo press, Japan's aircraft industry is striving to develop high-tech aircraft to keep abreast of US and British technologies. Development efforts are seen in the areas of an energy-efficient aircraft, a Mach 25 hypersonic aircraft, and two types of commuter aircraft. Japan hopes to team up with the PRC in the development of commuter aircraft.

According to recent Tokyo press reports, the Japanese aircraft industry has been trying to keep abreast of US and British development programs. In addition to ongoing international joint projects such as the YXX transport and the V2500 engine, areas of development include an energy-efficient aircraft, a Mach 25 hypersonic transport, and two commuter aircraft, one with 40 seats and the other with 80. Both of these commuter aircraft may be developed in conjunction with the PRC. Details of the individual development initiatives follow:

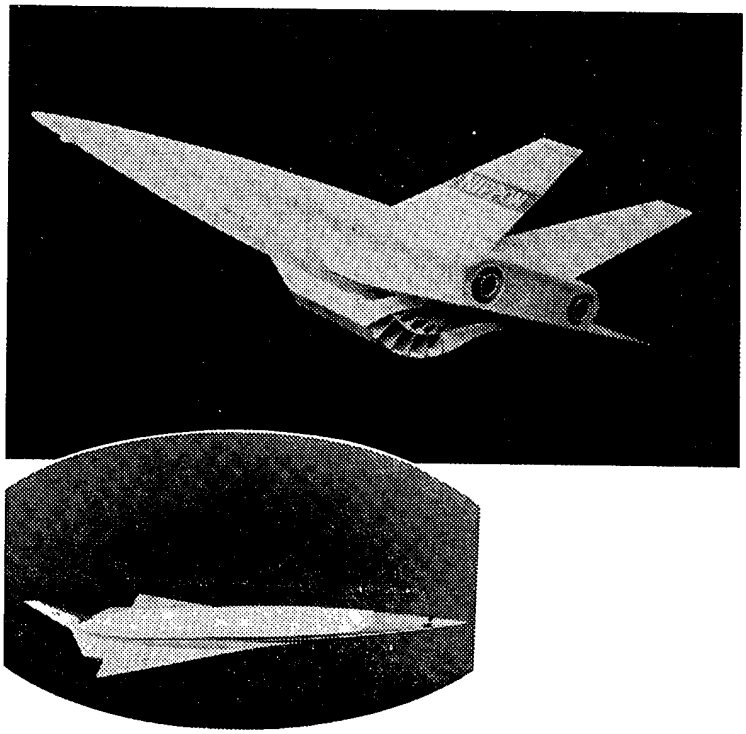
1) Energy-efficient aircraft: The 31 May NIHON KEIZAI SHIMBUN reports that the Science and Technology Agency has announced a development plan for a super energy-efficient aircraft which can fly half way around the world without refueling. A large subsonic (Mach 0.8-0.9) aircraft is the conceptual basis for this aircraft. The expected fuel consumption is half that of modern aircraft. Lightweight composite materials, new ceramic materials, and optical fibers will be integrated into the construction of this future aircraft. The engine should be something like a superhigh bypass engine which is more efficient than a conventional jet engine. The project will begin in FY87 and is expected to be completed by 1997.

2) Mach 25 hypersonic aircraft: The development of this aircraft was disclosed immediately after the announcements of the US decision to build the "Orient Express" and of the British HOTOL (horizontal take-off and landing), a transatmospheric space transport. This project will start in FY87. Its speed of Mach 25 would exceed Concorde's Mach 2.2 by more than a factor of 10. This transport could travel from Washington to Tokyo in less than two hours. Space applications or possible military use may play a significant role in its developmental stage, according to NIKKAN KOGYO SHIMBUN on 5 June. The National Aerospace Laboratory (NAL) is examining the possibility of a supersonic air-breathing engine combining jet and rocket engines. According to NIHON KEIZAI SHIMBUN of 8 April, NAL has worked nearly 10 years on a small project involving a similar type of air-breathing engine.

The development fund is 200 billion yen for a completed first test aircraft slated for 2005. NAL and Mitsubishi Heavy Industries will cooperate and Kawasaki Heavy Industries, Fuji Heavy Industries, Ishikawajima-Harima Heavy Industries, and Nissan Motor Co. are also under consideration for participation, according to the 7 July NIHON KOGYO SHIMBUN. Japan would eventually team up with other countries in a joint project. The Ministry of International Trade & Industry plans to establish a research organization, tentatively called the "Special Space Committee," within the Society of Japanese Aerospace Companies to enhance the hypersonic aircraft development.

3) 40-seat commuter aircraft: This Sino-Japanese joint development project is still at the feasibility study level. Its completion is slated for 1990. This plan was requested by the PRC, according to NIKKAN KOGYO SHIMBUN of 20 November, and was agreed to in November 1985. The conceptual basis for this aircraft is the Japanese-produced YS-11. The Tokyo press mentions no other country's involvement in this joint effort.

4) 80-seat commuter aircraft: On 12 June, a government authority disclosed a plan to offer the PRC joint development of an 80-seat aircraft. Initial production of this aircraft is anticipated in 1995. NIKKAN KOGYO SHIMBUN of 13 June points out that Japan wants to take the lead in this market.



Artists' conceptions of Japan's hypersonic aircraft (above) and US Orient Express (below)
(Tokyo NIHON KOGYO SHIMBUN 7 Jul 86 p 1)

Available reports do not indicate if this project is a counteroffer to the PRC-requested 40-seat aircraft venture, but it is clear that industry interest is largely focused on the 80-seat venture.

(A translation of the above sources will appear in JAPAN REPORT: SCIENCE AND TECHNOLOGY.)

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WEST EUROPE: VARIED PRESS REACTION TO NEW EUREKA PROJECTS

Key Points: The announcement of 62 new Eureka projects on 30 June was generally greeted with approval by the West German, Dutch, and British press. The French press, however, voiced reservations.

Eureka's 62 new projects—amounting to some 2.1 billion ECUs—were announced on 30 June. France, already committed to 40 of the projects and considering joining two others, has emerged as the leading participant followed by the UK and the FRG. The EC Commission has shown interest in supporting 10 projects, the FINANCIAL TIMES of 1 July reported.

The largest project is the establishment of the European Software Factory. Funded at 327 million ECUs, the project will be undertaken by France, the FRG, Norway, Spain, and Sweden and is scheduled to run for eight years.

Other major ventures include:

EAST (Eureka Advanced Software Technology): Denmark, Finland, France, Italy, and the UK will participate. An estimated 141 million ECUs has been allocated for the project, which is scheduled to run for six years.

HDTV (High Definition Television): France, the Netherlands, the FRG, and the UK will participate along with Belgium, Italy, and the EC Commission as possible partners. The project is funded at 180 million ECUs and is to be completed in four years.

Wideband Telecommunications System Development: France, Italy, and the UK will participate. The project is funded at 160 million ECUs and is expected to run for five years.

The European press commentaries which followed the announcement have been varied, although generally positive. Typical of the French press, LE MONDE INFORMATIQUE of 7 July describes the London conference as "a nice achievement for Eureka."

L'USINE NOUVELLE on 10 July, however, presents a somewhat dim view of the situation surrounding Eureka. The journal indicates that Eureka is overshadowed by SDI. Given its limited personnel and financial resources, the journal points out, active European participation in both Eureka and SDI would be extremely difficult. The journal says, for example, that relatively modest participation by the UK and the FRG in the Eureka program is the result of their prior commitments to SDI. In addition, American firms are competing with European firms by trying to hire researchers away with offers of higher salaries and better working conditions.

L'USINE NOUVELLE also criticizes the Eureka program for failing to represent a real technological leap forward. "Europe," it observes, "is too often satisfied by modernization of its existing means of production or by timid innovation." A FINANCIAL TIMES editorial on 30 June noted that one "plausible explanation for European companies' weakness is lethargic and introverted management." Unlike their American and, increasingly, their Japanese rivals, few of them have bothered to organize themselves and market their products aggressively on a Europe-wide basis.

(Translations or copies of the sources cited in this article can be provided upon request. Translations of several of the sources will appear in EUROPE REPORT: SCIENCE & TECHNOLOGY.)

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USSR: NEW METHOD FOR MONITORING METAL MELT COMPOSITION CLAIMED

Key Points: In a team effort lasting almost three years, academicians from the largest Soviet institute engaged in basic physics research have aided metallurgists by developing a method for monitoring composition of metal melts. The method may dramatically increase Soviet production of ferrous and nonferrous metals, including copper and nickel.

According to the March issue of VESTNIK AKADEMII NAUK SSSR and LENINGRADSKAYA PRAVDA of 8 June, researchers at the Physicotechnical Institute im. A. F. Ioffe have developed a new technique for monitoring steel melts. This metallurgical advance from the Institute's "Fiztek" laboratories, known as the FTIAN system, permits metallurgists to conduct steel melts uninterruptedly while taking specimens to determine whether a specific steel "grade" (targeted composition) has been attained. Former techniques required analytical interruptions in the melt process which resulted in steels not of targeted "grade" composition which had to be junked.

The system's mass spectroscopy unit, called "mass-reflektron," takes specimens of effluent gases, filters out dust, and uses computers to process data on gas composition and melt, as well as information from converter sensors. This information is then displayed on a video terminal. The FTIAN system, which eliminates much of the uncertainty in producing specific steel compositions, has also been adapted to nonferrous metallurgy—the smelting of copper and nickel—where determination of sulphur in effluent gases is needed to achieve clean melts.

The government certified the FTIAN system after testing it at the "Azovstal" metallurgical plant. Good results were also obtained at the Norilsk Metallurgical Plant of the Mintsvetmet (Ministry of Nonferrous Metallurgy) and at the Kremikovsk Plant in Bulgaria. With the FTIAN system, 90 percent of steel melts have been "grade", whereas, without the system less than 50 percent of the melts resulted in "grade" steels.

The system was rated by the President of the USSR Academy of Sciences as "one of the best developments by Soviet scientists" in the past year. The Minister of Ferrous Metallurgy noted that the introduction of FTIAN in a number of ferrous and nonferrous metals plants will increase production by millions of tons. Because of manufacturing and computer problems, however, the Physicotechnical Institute, which had planned to construct 12 such systems, has built only six.

(Translations of the sources cited will appear in USSR REPORT: METALLURGY.)

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REPORTS

REPORTS surveys research trends in articles and books involving a particular field of science and technology. It also includes summaries and listings of articles and books which may serve as potential sources for future research. Conference proceedings will also be occasionally presented in this section.

USSR: RECENT SOVIET BOOKS DEALING WITH NUCLEAR POWER PLANTS

The following titles are recent acquisitions and supplement those noted in previous issues of SCIENCE AND TECHNOLOGY PERSPECTIVES (Vol 1, No 4 30 June 1986 and Vol 1, No 5 22 July 1986).

1. NUCLEAR POWER PLANT PUMPS

The heating configurations of an AES (nuclear power plant) are discussed, together with pump aggregate operation and requirements. The design characteristics of the pumps and the individual aggregates are described. Detailed information is provided on various types of systems, and different methods for calculating technical requirements of the main units are described. The last chapter is devoted to pump durability and reliability. The manual is targeted for university-level students. (Moscow Nasosy AES: Uchebnoye posobiye dlya vuzov," by V. M. Budov, in Russian 1986, 403 pp).

2. CONTROL AND EMERGENCY SYSTEMS FOR NUCLEAR POWER PLANTS

The book deals with principles of continuous and discrete control and emergency-management systems used for designing and operating a nuclear power plant. Methods for controlling and managing technological processes at a nuclear power plant are described. The book is intended for nuclear plant personnel. (Moscow Sistemy upravleniya i zashchity AES" by Valeriy Vasilyevich Korolev in Russian 1986, 128 pp).

3. CENTRAL HEATING STEAM TURBINES

The book examines TMZ (Moscow Turbine Plant) turbines, as well as other domestically produced turbines. Information is provided on capacity and operation requirements, and recommendations for startup/shutdown of the turbines and servicing are listed. This book substantially updates the book published in 1976, and includes data on power turbines produced in recent years. The book is intended for power plant engineering and technical personnel. (Moscow Teplofikatsionnyye parovyye turbiny," edited by D. P. Buzin, in Russian 1986, 408 pp).

(Translations of the tables of contents, annotations, and introductions to the books cited above will appear in USSR REPORT: ENGINEERING AND EQUIPMENT.)

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FRANCE: DESPITE SETBACKS, GREATER ROLE IN SPACE SOUGHT

The French press, including LIBERATION of 8 July, reports that the Ariane space program faces serious difficulties in the wake of its two recent launch failures. According to the source, "it will be necessary to reexamine closely the ignition system of the HM-7 motor of the Ariane third stage, which has been responsible for the failures." Despite these setbacks, the Chirac government remains committed to an active space program featuring competition with the United States and the industrial development of space.

U.S. Competition/Internal Competitive Environment

According to the AGRA DATABASE, Minister of Industry Alain Madelin on 6 June reaffirmed the importance of French space industry competition with the United States and called for talks "to establish sound rules of competition between the two Western launch operators." Madelin also observed that to create a competitive environment, increased opportunity to participate should be given to small- and medium-sized companies that at present are overshadowed by CNES (National Center for Space Studies), Matra, Aerospatiale, and Dassault.

Industrial Use of Space

French proposals for commercial space projects have recently been under discussion and the scope of government interest can be seen in a 19 June L'USINE NOUVELLE article. It explains OFTA's (French Observatory for Advanced Technologies) strategy in encouraging French industry to experiment with industrial uses of space in such areas as electronics, new materials, and biotechnology. According to the L'USINE NOUVELLE article, French experts have suggested that CNES set aside an annual budget of Fr 150 million for "large space projects in industrially promising areas." Experts also recommended that CNES offer free launches as an incentive to industry and defray manufacturer costs of reconfiguring experiments for space.

The following table from L'USINE NOUVELLE shows areas of possible industrial space manufacturing which, according to OFTA, present promising opportunities for French companies.

Electronics	New Materials	Biotechnology
Ultra large-scale GaAs integrated circuits for computers	Optical fibers for telecommunications in the medium infrared region	Cell and protein crystals (new medicines)
Laser diodes and detectors for the medium infrared region	High-power small-sized neodymium lasers	Purification through electrophoresis (vaccines, medicines)
Ultrarapid arithmetic logic for optical computers	Semiconducting glasses	
Thin films for optical electronics	Hollow spheres for fusion	
High-temperature superconducting materials	Alloys reinforced with crystalline or amorphous fibers	
Superconductors		
	Supermagnetic materials	
	Light alloys	

(A translation of the AGRA DATABASE item cited above will appear in EUROPE REPORT: SCIENCE AND TECHNOLOGY.)

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EUROPEAN COMMUNITY: HERMES PROJECT DISCUSSIONS CONTINUE

Recent press reports indicate continued European interest in participating in the Hermes program. Decisionmaking activities of the EC, France, and the FRG involving Hermes are discussed below.

European Community

According to AIR & COSMOS of 5 July, the European Space Agency has officially added the Hermes project to its agenda. France has been conducting feasibility and design studies in cooperation with companies in Belgium, Italy, the Netherlands, Austria, the FRG, and Switzerland. The National Center for Space Studies estimates the cost of developing the Hermes minishuttle at 2.12 billion ECUs. This figure does not include management costs or the possible construction of a reduced-scale shuttle called Maia as a hypersonic demonstrator.

France

AIR & COSMOS reports on 12 July that France has proposed the use of Hermes to service Soviet orbital stations. Initial discussions are to take place during the French-Soviet meeting in late October in Yerevan on compatibility between the Hermes minishuttle and the new Mir space station. The French National Center for Space Studies and NASA have decided to accelerate joint studies on Hermes compatibility with the US space station.

FRG

Bonn has again delayed its decision to participate in the Hermes program, according to AIR & COSMOS of 28 June. On 20 June, Minister for Research and Technology Heinz Riesenhuber announced that the decision will not be made until the summer of 1987 on when the ESA ministers meet. The postponement follows the removal of the BMFT's head of space and aeronautics, Wolfgang Finke, a staunch Hermes supporter. Riesenhuber is determined not to finance participation from his ministry's budget. Moreover, he regards as unrealistic French cost estimates for the development of Hermes.

(Translations of some of the above sources will appear in EUROPE REPORT: SCIENCE AND TECHNOLOGY.)

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PREVIEWS

PREVIEWS is an annotated list of selected science and technology items being translated by FBIS. The list may also contain previously published items of wide consumer interest.

CHINA REPORT: SCIENCE AND TECHNOLOGY

PRC: ANTIBIOTICS EXPORTS

A PRC antibiotic, tetracycline HCl, has attained recognition on the international market. Its quality is said to have surpassed standards published in the British Pharmacopoeia and North America. (Shanghai JIEFANG RIBAO 26 May 86 p 1)

EUROPE REPORT: SCIENCE AND TECHNOLOGY

AEROSPACE

NEW PROGRAM DEFINITION FOR COLUMBUS SPACE SYSTEM

Details of the new system configuration were presented at the Hanover meeting. A timetable for future studies, construction, and launch is given. Cost estimates and associated data relay satellite system are discussed. (Paris AIR & COSMOS 21 Jul 86 pp 33-38)

CIVIL AVIATION

FRENCH-ITALIAN ATR 72 PERFORMANCE FIGURES, CHARACTERISTICS

The article gives operating cost estimates and a timetable from development to delivery. A design illustration is shown. (Paris AIR & COSMOS 21 Jul 86 pp 13-14)

COMPUTERS

FRANCE'S AEROSPATIALE: ACTIVITIES IN FIELD OF EXPERT SYSTEMS

Aerospatiale's wide field of ES programs includes failure detection and diagnosis in a missile launcher, design system, expert systems on board aircraft, fiber orientation in composite materials, aircraft maintenance, and others. (Paris AIR & COSMOS 28 Jun 86 pp 20,56)

FACTORY AUTOMATION

ROLLS-ROYCE: MACHINING CELL FOR COMPRESSOR BLADE ROOTS

The article gives a detailed description of the equipment and process. (Paris AIR & COSMOS 28 Jun 86 p 32)

ADVANCED MACHINE TOOLS EXHIBITED AT INTERNATIONAL CIM WEEK

Computer integrated Manufacturing products by European manufacturers are described. (Paris AIR & COSMOS 21 Jun 86 pp 39-40)